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# Materials for the Distribution of Lichens in Japan (19) *Leiorreuma yakushimense* (M. Nakan.) M. Nakan. & Kashiw. and *Siphula decumbens* Nyl.

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Summary: *Leiorreuma yakushimense* (M. Nakan.) M. Nakan. & Kashiw. and *Siphula decumbens* Nyl. were found in Yakushima Island, southern Japan. This becomes the second finding in 50 years after collection of the type specimen in 1963. *S. decumbens*, a species thought to have been extinct in Japan, was rediscovered on the trunk base of old growth *Cryptomeria japonica*.

***Leiorreuma yakushimense*** (M. Nakan.) M. Nakan. & Kashiw.

*Leiorreuma yakushimense* is an endemic species of the *Graphidaceae* in Japan. It was originally described by Nakanishi (1966) under *Phaeographis yakushimensis* M. Nakan., being recently treated under *Leiorreuma* (Nakanishi et al. 2003). It was based on two syntype specimens collected on Mt. Nagata-dake in Yakushima Island (Type collection: JAPAN, Kyushu, Kagoshima Pref., Mt. Nagata, July 1963, M. Oshio 9319, HIRO–lectotype). During our field work for endangered lichens in Yakushima Island in March 2012, we found this species on the bark of *Daphniphyllum macropodum* along the trail from Yodogawa Hut to Hananoego, Kumage-gun, Kagoshima Prefecture, at an elevation of about 1500 meters. The specimens collected by us have the following diagnostic characteristics: thallus corticolous, crustose, pale greenish gray, subnitid; lirellae erumpent, covered with up to nearly top of labia; disc black, open, concave, without pruina (Fig. 1A); proper exciples thickly and completely carbonized basally(Fig. 1B), thinly carbonized laterally, covered by outer brownish tissue 100–120 μm thick (Fig. 1C); hymenium inspersed; spores dark brown (only post mature spores were observed in the present specimens) with 8–10 transverse septa, 40–43 × 9–11μm in size. Hypostictic acid (major), hyposalazinic acid (minor) and unknown pigment related to vioxanthin (trace) were detected by TLC or HPLC (Dr. J. A. Elix pers. comm.).

When Nakanishi (1966) described *Phaeographis yakushimensis*, he just cited “K — , P — ” as chemical reactions and did not mention any chemical substance for the species. However, this species contains hypostictic acid as a major chemical substance cited above. The characteristic features of our specimens, however, coincide very well morphologically and chemically with a syntype of *Phaeographis yakushimensis* (M. Oshio 9265, TNS).

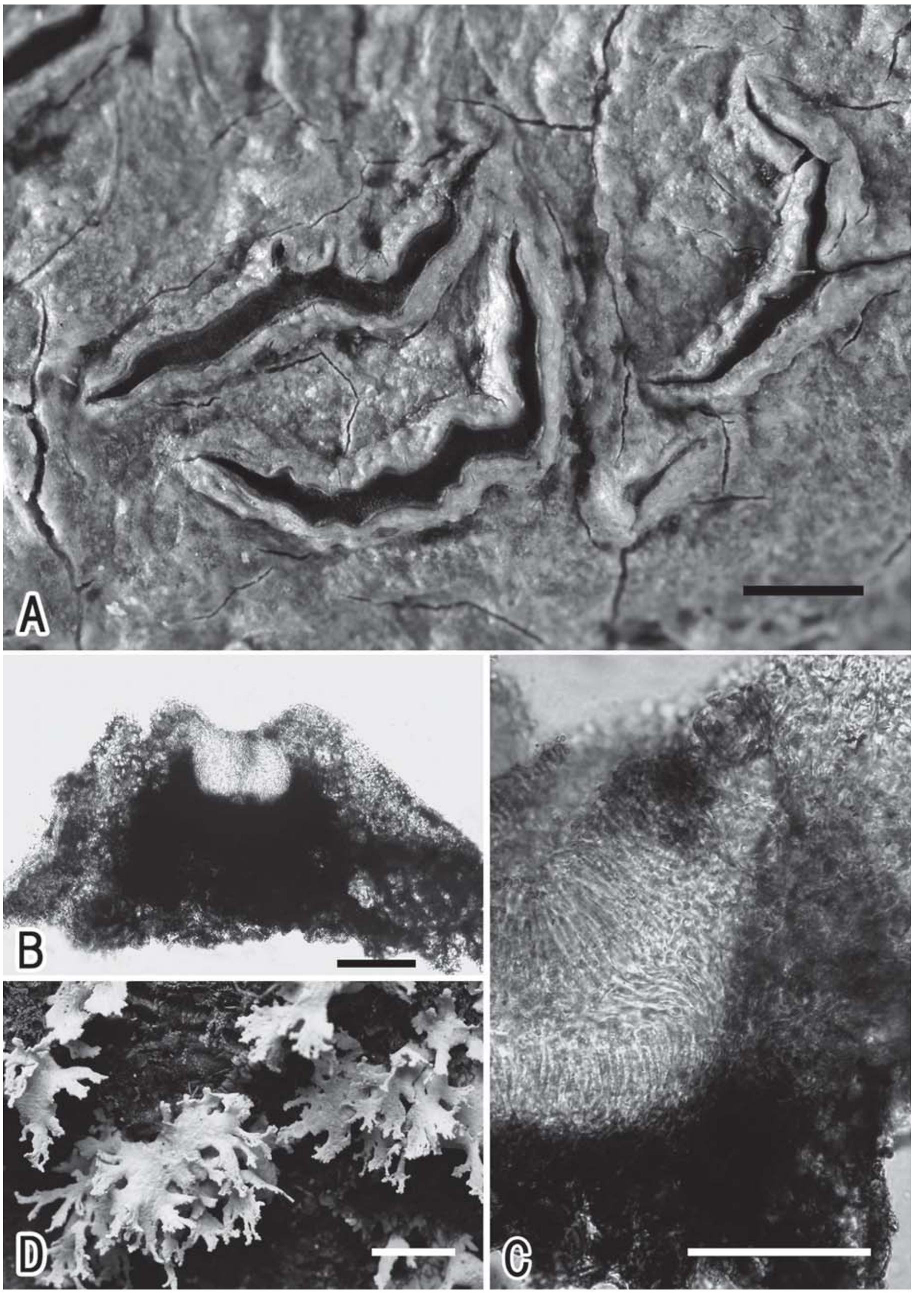

Fig. 1. A–C. *Leiorreuma yakushimense* (M. Nakan.) M. Nakan. & Kashiw. (H. Kashiwadani 50567, TNS). A. Habit. B. Cross section of an apothecium, showing well developed thalloid exciples and distinctly carbonized proper exciple. C. Magnification of "B", showing inspersed hymenium and carbonized exciple. D. Habit of *Siphula decumbens* Nyl. (H. Kashiwadani 50589, TNS). Scale bars = 1 mm (A, D), 100 µm (B, C).

This species might be confused with *Leiorreuma exaltatum* (Mont. & v. d. Bosch) Staiger, a species widely distributed in eastern Asia, which differs in having flat disc covered with white pruina, completely carbonized exciple basally and laterally and in producing stictic acid instead of hypostictic and hyposalazinic acids. It also resembles *Phaeographis asteriformis* (Zahlbr.) M. Nakan. in general morphology. However, the latter species has brownish exciple without carbonization, flat to more or less convex disc, clear hymenium and completely lacks chemical substance.

*Leiorreuma yakushimense* is so far known only in Yakushima Island, where it grows exclusively on bark of deciduous broad-leaved trees at an elevation of above 1500 meters.

Specimens examined. JAPAN. Kyushu. Prov. Ohsumi (Kagoshima Pref.): Mt. Nagata, July 1963, M. Oshio 9265 (HIRO, TNS); en route from Yodogawa Hut to Hananoego, Kumage-gun (Yakushima Island), on bark of *Daphniphyllum macropodum,* elevation about 1500 m, March 14, 2012, H. Kashiwadani 50567 (TNS); the same locality and date, on tree bark, 1465 m, S. Takeshita & H. Miyawaki (14038, TNS).

***Siphula decumbens*** Nyl.

This species is widely distributed in tropical to temperate regions in the world, having been reported from Africa, tropical America, eastern Asia and Tasmania (Kantvilas 1998, 2002, Kantvilas et al. 2005). In Japan, it was collected only once in Shikoku (Kantvilas et al. 2005). Although no other locality for the species has been reported since then, we recently collected specimens in Yakushima Island to be identified with the present species (Fig. 1D).

*Siphula decumbens* is well characterized taxonomically by Kantvilas (2002). In Japan, it might be confused with some sterile specimens of *Physcia* Fr., as they have whitish gray dorsiventral lobes. However, it is easily distinguished from the latter by the absence of rhizines on the lower surface, the thin upper cortex composed of cartilaginous hyphae and by the production of thamnolic acid; species of *Physcia* have a paraplectenchymatous upper cortex and do not produce thamnolic acid as a chemical substance.

One specimen collected by Moon in Yakusugi Land (Yakusugi-rando) in Yakushima Island is also identified with this species. In the island, it grows on the bark or over mosses on the trunk base of old growth *Cryptomeria japonica* at elevations between 1200 to 1300 meters.

Specimens examined. JAPAN. Shikoku. Prov. Tosa: Mt. Ohdo-yama, Umaji-mura. August 1, 1931, F. Fujikawa s.n. (TNS). Kyushu. Prov. Ohsumi (Kagoshima Pref.): En route from Yakusugi Land (Yakusugi-rando) to Yodogawagoya-iriguchi, Yaku-cho, Kumage-gun (Yakushima Island), on bark of *Cryptomeria japonica*, elevation about 1300 m, March 15, 2012, H. Kashiwadani 50589 (TNS); the same locality, 1200–1300 m, September 27, 2005, K. H. Moon 8500 (TNS).

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## Literatures cited

Nakanishi M. 1966. Taxonomical studies on the family *Graphidaceae* of Japan. J. Sci. Hiroshima Univ., Ser. B, Div. 2 (Bot.) **11**: 51–126.

Nakanishi M., Kashiwadani H. and Moon K. H. 2003. Taxonomical notes on Japanese *Graphidaceae* (*Ascomycotina*), including some new combinations. Bull. Natn. Sci. Mus., Tokyo, Ser. B, **29**: 83–90.

Kantvilas G. 1998. Studies on the lichen genus *Siphula* in Tasmania II. The *S. decumbens* group. Herzogia **13**: 119–138.

Kantvilas G. 2002. Studies on the lichen genus *Siphula*. Biblioth. Lichenol. **82**: 37–53.

Kantvilas G., Kashiwadani H. and Moon K. H. 2005. The lichen genus *Siphula* Fr. (*Lecanorales*) in East Asia. J. Jpn. Bot. **80**: 208–213.

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## 地衣類分布資料 (19)　ヤクシマモジゴケとコバノシロツノゴケ

ヤクシマモジゴケ *Leiorreuma yakushimense* (M. Nakan.) M. Nakan. & Kashiw. は日本特産種で，屋久島だけに産することが知られている。本種は 1963 年に基準種が屋久島の永田岳付近で採集されて以来，新たな報告がなかった．ところが筆者らが 2012 年 3 月に地衣類絶滅危惧種の調査のため屋久島を訪れた際，淀川小屋から花之江河へ向かう登山道脇のユズリハや落葉樹の樹皮上で本種を発見した．本種の特徴は次の通りである：地衣体は痂状，リレラは地衣体上に突出し，ラビアは上部近くまで地衣体に被われる，盤は黒色で凹み粉霜はない。果殻は基部で厚く炭化するが側部は褐色化するものの炭化度は下部に行くほど強い．子嚢層は顆粒を含む．胞子は長楕円形，褐色，8–9 本の横隔膜を有し，35–40 × 8–10 μm．地衣成分としてヒポスチクチン酸 (hypostictic acid) を主成分とし，微量のヒポサラチン酸 (hyposalazinic acid) とビオキサンチン (vioxanthin) 系の色素を含む．

本種は東アジアに広く分布するヘリトリモジゴケ *Leiorreuma exaltatum* (Mont. & v. d. Bosch) Staiger に似ているが，ヘリトリモジゴケは盤に灰白色の粉霜を持ちスチクチン酸を含むので区別できる．ボンジゴケ *Phaeographis asteriformis* (Zahlbr.) M. Nakan. も本種と混同される可能性があるが，ボンジゴケは茶褐色の果殻は炭化せず，側糸に微顆粒を含まないことや地衣成分を産出しないので区別できる．

コバノシロツノゴケ *Siphula decumbens* Nyl. は欧州，北米，南米を除く地域に広く分布する．日本では極めて稀で，1931 年に高知県馬路村で一度だけ採集されているがその後採集された記録はない．この度，屋久島の絶滅危惧地衣類を調査中にヤクスギランド上部，標高約 1340 m 付近でスギの古木に生育するコロニーを発見した．生育地は片側が灌木で被われているものの日中は日光が差し込む状況である．地衣体は地上 0.3 〜 1 m 付近に数十個体が群落をなして生育していた．また，筆者の一人文 光喜がヤクスギランド付近で採集し国立科学博物館標本庫に保管されていた 1 標本も本種と同定された．白谷雲水峡の白谷小屋付近でも小さい個体の生育が確認された．

本種は常に無子器であり，地衣体はムカデゴケ属 *Physcia* と酷似している．しかし，ムカデゴケ属各種は必ず地衣体裏面に仮根を生じ，異形菌糸組織からなる上皮層を持つのに対し，本種は仮根を欠き，繊維状菌糸組織の上皮層を持つ点やムカデゴケ属には含まれないタムノール酸を含有するので区別できる．

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